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Case Report

Aesthetic rehabilitation of a case of polydiastema in the upper anterior region with direct composite restoration using the injection molding technique: case report

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ABSTRACT

Diastema is the gap between the teeth or mesiodistal gaps caused by the size difference of the teeth. More than one diastema in the jaw is called "polydiastema." Polydiastema can occur for various reasons. These reasons include harmful habits and genetic or systemic disorders. In this case report, restoration of an anterior polydiastema case with direct flowable composite resin is described. A 29-year-old female patient was admitted to our clinic with a gap between her maxillary teeth. Treatment options were evaluated with the patient, and it was decided to close the diastema with direct composite resin restoration using injection molding technique. After the restoration was completed, finishing and polishing procedures were performed. In the control examination, it was determined that the restorations met the patient's aesthetic expectations.

Keywords: Anterior aesthetics, polydiastema, flowable composite resin, injektion molding

INTRODUCTION

Today, with the increasing awareness of people, the aesthetic factor has started to gain importance. In the past, the patients' wish was to avoid pain, whereas now aesthetics has also become more important. More often, color, shape, and position disorders in anterior teeth cause aesthetic and psychosocial problems in patients.[1]

Gaps between the anterior teeth are defined as diastema. The gap or diastema in the anterior maxillary region is a common aesthetic problem in patients.[2] In the etiology of diastema; labial frenulum, microdontia, mesiodens, wedge-shaped lateral incisors, cysts in the midline region, habits such as finger sucking, tongue thrusting and/or lip sucking, dental defects, genetics, maxillary incisor proclination, dental-skeletal incompatibilities and defective union of the interdental septum should be considered as factors that may cause diastema.[3,4]

The duration of diastema treatment has become an important criterion. In the past, crown restorations with loss of tooth substance were applied to correct deformities in the anterior teeth.[5] Nowadays, laminates, orthodontic treatments, or direct adhesive restoration applications have become alternative options.[6]

Recent developments in adhesive systems allow restorations to be made without touching the tooth structure or with minimal material removal. In addition, thanks to advancing technology, the size of filler particles in composite resins has been reduced and the polishability and optical properties of composites have been improved. Composite resins used today offer various color and opacity options to physicians.[7]

CASE

In this case report, a 30-year-old female patient with diastema of the maxillary anterior teeth was admitted to the Dicle University Faculty of Dentistry, Restorative Dentistry Clinic. On examination, the patient was periodontally healthy and had a normal vertical bite (**Figure 1**).

Figure 1. Intraoral view of the polydiastema before restorative treatment

The patient was examined and informed about appropriate treatment options. The patient agreed to treatment with

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composite resin. First, an impression was taken from the patient with silicone. Then, our impression was waxed up by the technician over the plaster model. The wax-up was presented to the patient's liking with a mock-up application in the patient's mouth with acrylic that hardens in the mouth. After the patient's approval, color selection was made. The tooth surfaces were then individually roughened with 37% orthophosphoric acid gel (Ruby Etch, İstanbul, Turkiye) for 30 seconds. Two-stage self-etch adhesive G-BOND (GC Europe, Tokyo, Japan) was applied to the abraded surfaces. After waiting for 5-10 seconds, it was dried with compressed air for 5 seconds and then polymerized with a halogen light device for 20 seconds. The teeth next to the tooth were protected with Teflon tape, the apparatus we obtained with a transparent impression was placed in the patient's mouth, and a high-filling flowable composite resin [G-aenial Universal Flo (GC Corporation, Tokyo, Japan)] was placed through the hole we drilled incisally. It was then polymerized for 20 seconds. After repeating these procedures for the anterior 6 teeth, necessary corrections were made. Finishing and polishing procedures were performed using fine-grit diamond burs, polishing discs (RubyPlaton, İstanbul, Turkiye), and elastics (Clearfil Twist Dia, Kuraray, Japan). The patient was called for a check-up after 6 months. No aesthetic problems were found (**Figure 2-4**).

Figure 2. Direct composite restoration using the injection molding technique

Figure 3. Intraoral view after finishing and polishing procedures

Figure 4. Intraoral view after restorative treatment

DISCUSSION

The presence of discoloration and diastema in the anterior teeth, which directly affect smile aesthetics, becomes more important, especially in young patients. Diastemas can be treated with surgical, prosthetic, orthodontic, or restorative applications or their combination depending on the case and factor.[8] Advancements in adhesive techniques and materials have made it possible to use composite resin materials safely in anterior aesthetic cases, providing physicians with much easier and faster solutions. In the treatment of diastema cases, a treatment protocol xis determined by considering many factors, such as the age of the patient, the size of the diastema, time, and cost. Advantages and disadvantages are evaluated, and indirect or direct technique is decided. Composite restorations made by blending into the tooth surface are the most preferred treatment method because they can be applied in a single session, the application time is short, and the cost is low. Another advantage of this treatment method is the option of repair in case of any fracture in the restoration.[9]

Today, diastema closure has become a frequently performed procedure in the clinic as a result of increased aesthetic expectations. Direct composite resin restorations in diastema treatments, besides being a non-invasive approach, have yielded functional and aesthetic satisfactory results for both the patient and the physician.[10]

According to studies, it has been reported that composite resin restorations cannot provide enamel-like reflection and transparency, especially in the anterior regions when compared with ceramic restorations.[11] Composite resins have disadvantages such as surface roughness, polymerization shrinkage, microleakage, fragility, and low wear resistance. Contamination of the resin with blood or saliva during restoration, inadequate polymerization, faulty finishing and polishing processes, or color changes due to smoking and dietary habits are important disadvantages for composite resin restorations.[12] In recent years, these criticisms have decreased with the production of ceramic-added composite resins with color scales of different opacities, such as enamel and dentin. Nowadays, direct composite resin restorations have come to the forefront among conservative restoration options based on the principle of maximum tooth tissue preservation. Direct composite resin restorations, which are

less costly and can be completed in a single session compared to those made with the indirect method, exhibit less marginal leakage since they do not require an intermediate bonding agent, and accordingly, the risk of discoloration and caries formation between the restoration and tooth tissue is reduced. Another advantage of composite resin restorations is that they can be easily repaired with a similar composite resin and binding agent if fracture occurs.[13]

CONCLUSION

The technique we used in this case shortens the time the physician spends at the bedside. Since we do not have a mock up available in other techniques, first measurements are made to ensure that the teeth are of the appropriate length and width, and then composite resin is added to them accordingly. However, in the injection molding method, since we take measurements from the mock up we have, it has already taken the shape of the teeth. It is not necessary to shape additional teeth. The injection molding technique provides the opportunity to utilize the manual skill of both the physician and the technician. It allows the physician to give the most suitable form to the tooth shape by spending less time. In addition to these, there are also application difficulties. This technique can be used on both anterior and posterior teeth, but it is not used much in the posterior as it is more difficult to use.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Sadioğlu B, Çobanoğlu N. Anterior bölgedeki polidiastema vakasının direkt kompozit rezin restorasyon ile estetik rehabilitasyonu: olgu sunumu. *Selcuk Dent J.* 2022;9(4):103-106. doi:10.15311/selcukdentj.1061337
2. Koora K, Muthu MS, Rathna PV. Spontaneous closure of midline diastema following frenectomy. *J Indian Soc Pedod Prev Dent*. 2007;25(1):23-26. doi:10.4103/0970-4388.31985
3. Tanaka OM, Morino AY, Machuca OF, Schneider NÁ. When the midline diastema is not characteristic of the "ugly duckling" stage. *Case Rep Dent*. 2015;2015:924743. doi:10.1155/2015/924743
4. Weber, Quoted in: Orthodontic Principles and Practice, edited by: Graber T.M., Saunders W.B. Company 3rd edition, 1972.
5. Frese C, Schiller P, Staehle HJ, Wolff D. Recontouring teeth and closing diastemas with direct composite buildups: a 5-year follow-up. *J Dent*. 2013;41(11):979-985. doi:10.1016/j.jdent.2013.08.009
6. Wolff D, Kraus T, Schach C, et al. Recontouring teeth and closing diastemas with direct composite buildups: a clinical evaluation of survival and quality parameters. *J Dent*. 2010;38(12):1001-1009. doi:10.1016/j.jdent.2010.08.017
7. Çelik Ç. Current resin composite systems. *Turk Klin J Restor Dent Special Topics*. 2017;3(3):128-137.
8. de Araujo EM Jr, Baratieri LN, Monteiro S Jr, Vieira LC, de Andrada MA. Direct adhesive restoration of anterior teeth: part 2. Clinical protocol. *Pract Proced Aesthet Dent*. 2003;15(5):351-359.
9. Berksun S, Kedici PS, Saglam S. Repair of fractured porcelain restorations with composite bonded porcelain laminate contours. *J Prosthet Dent*. 1993;69(5):457-458. doi:10.1016/0022-3913(93)90151-d
10. Bakır EP, Yıldırım ZS, Bakır Ş. Anterior polidiastemaların direkt kompozit rezin restorasyonlarla kapatılması: 5 olgu sunumu. *Atatürk Üni Diş Hek Fak Derg.* 2016;15(1):18-25.
11. Chaves LP, Schmitt VL, Consolgmano E, Frenken RP, Lia Mondelli RF, Wang L. Resin composite build ups for complementing multidisciplinary esthetic and functional dental treatments: a case report. *Braz Dent Sci.* 2015;18(1):28-33. doi:10.14295/bds.2015.v18i1.1069
12. Korkut B, Yanıkoğlu F, Tağtekin D. Esthetic approaches to anterior defects with direct composite resin restorations: 3 case reports. *Atatürk Üni Diş Hek Fak Derg.* 2012;6(1):7-15.
13. Yavuz B, Avcılar İH, Bakır EP. Aesthetic rehabilitation of a case of polydistema with direct composite restoration: case report, 2-year follow-up. *Dicle Dent J.* 2024;25(4):118-120. doi:10.70509/dicledentj.1592652